Biological Cybernetics

Volume 74
1996

Editor-in-Chief
G. Hauske
Lehrstuhl für Nachrichtentechnik
Technische Universität München
Arcisstrasse 21, D–80290 München, Germany

Editors
A. Aertsen
Weizman Institute
P.O. Box 26
Rehovot 76100, Israel

H. B. Barlow
Trinity College
Cambridge CB2 1TQ, UK

J. D. Cowan
Department of Mathematics
University of Chicago
5734 S. University Avenue
Chicago, IL 60637, USA

H. Cruse
Abteilung für Biologische Kybernetik
Fakultät für Biologie
Universität Bielefeld, Postfach 100131
D-33501 Bielefeld, Germany

M. Egelhaaf
Abteilung für Neurobiologie
Fakultät für Biologie
Universität Bielefeld
Postfach 100131
D-33501 Bielefeld, Germany

N. Franceschini
Laboratoire de Neurobiologie
Neurocybernetique
C.N.R.S. – L.N.B. 3
31, Chemin Joseph Aiguier
F-13402 Marseille Cedex 9, France

A. S. French
Department of Physiology and Biophysics
Dalhousie University
Halifax, Nova Scotia B3H 4H7, Canada

S. Gielen
Department of Medical Physics and Biophysics
University of Nijmegen
Geert Grooteplein Noord 21
NL-6525 EZ Nijmegen, The Netherlands

B. Hassenstein
Institut für Biologie I der Universität
Albertstrasse 21a
D-79104 Freiburg, Germany

V. Henn
Universitätsspital
Neurologische Klinik
und Poliklinik
Frauenklinikstrasse 26
CH-8091 Zürich, Switzerland

B. Julesz
Laboratory of Vision Research
Rutgers University of New Jersey
Psychology Building – Busch Campus
Piscataway, NJ 08854, USA

T. Kohonen
Helsinki University of Technology
Neural Networks Research Centre
Rakentajanaukio 2c
SF-02150 Espoo 15, Finland

P. König
The Neuroscience Institute
10640 John Jay Hopkins Drive
La Jolla, CA 92121, USA

W. R. Levick
The John Curtin School of Medical Research
The Australian National University
Department of Physiology
P.O. Box 334
Canberra City, A.C.T. 2601, Australia

H. Mallot
Max-Planck-Institut
für biologische Kybernetik
Spemannstrasse 38
D-72076 Tübingen, Germany

A. Michelsen
Odense Universitet
Campusvej 55
DK-5230 Odense M, Denmark

H. Mittelstaedt
Max-Planck-Institut
für Verhaltensphysiologie
D-82319 Seewiesen, Germany

T. Poggio
Massachusetts Institute of Technology
Artificial Intelligence Laboratory
and Department of Psychology
Cambridge, MA 02139, USA

G. Schöner
CNRS-LNC
31, Chemin Joseph Aiguier
F-13402 Marseille Cedex 20,
France

S. Stiehl
FB Informatik, AB Kognitive Systeme
Universität Hamburg
Vogt-Koelln-Strasse 30
D-22527 Hamburg, Germany

S. Tanaka
Laboratory for Neural Modeling
FRP, RIKEN, 2-1 Hirosawa,
Wako, Saitama 351-01, Japan

V. Torre
Università di Genova
Dipartimento di Fisica
Via Dodecaneso, 33
C.A.P.
I-16146 Genova, Italy

D. Varjú
Lehrstuhl für Biokybernetik
Universität Tübingen
Auf der Morgenstelle 28
D-72076 Tübingen, Germany

Springer

Biological Cybernetics

Copyright

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities all the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.

Manuscripts must contain a statement to the effect that all human studies have been reviewed by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in an appropriate version of the 1964 Declaration of Helsinki. It should also be stated clearly in the text that all persons gave their informed consent prior to their inclusion in the study. Details that might disclose the identity of the subjects under study should be omitted.

Reports of animal experiments must state that the "Principles of laboratory animal care" (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws (e.g. the current version of the German Law on the Protection of Animals) where applicable.

The managing editors reserve the right to reject manuscripts that do not comply with the above-mentioned requirements. The author will be held responsible for false statements or for failure to fulfil the above-mentioned requirements.

All articles published in this journal are protected by copyright, which covers the exclusive right to reproduce and distribute the article (e.g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.

The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.

While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept anyl legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Special regulations for photocopies in the USA

Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0340-1200, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

The Canada Institute for Scientific and Technical Information (CISTI) provides a comprehensive, world-wide document delivery service for all Springer-Verlag journals. For more information, or to place an order for an copyright-cleared Springer-Verlag document, please contact Client Assistant, Document Delivery, Canada Institute for Scientific and Technical Information, Ottawa K1A OS2, Canada (Tel: 613-993-9251; Fax: 613-952-8243; e-mail: cisti.docdel@nrc.ca).

This journal is included in the Springer Journals Preview Service. The Springer Journals Preview Service offers the tables of contents and BiblioAbstracts via Internet before the issue reaches the subscribers. Tables of contents are free of charge; BiblioAbstracts are available for a small annual fee. Details can be obtained by sending an e-mail message containing the line **help** to svjps@springer.de.

Printers: Konrad Triltsch, Würzburg, Germany

© Springer-Verlag Berlin Heidelberg 1996

Printed in Germany
Springer-Verlag GmbH & Co KG,
D-14197 Berlin, Germany

Springer

Contents of Volume 74

Abdusheva GR → Miftakhov RN
Akay M, Akay YM, Szeto HH: The effects of morphine on the relationship between fetal EEG, breathing and blood pressure signals using fast wavelet transform 367
Akay YM → Akay M
Amirikian BR → Lukashin AV
Andrade MA, Morán F: Structural study of the development of ocularity domains using a neural network model 243
Arndt PA → Mallot HA
Arnoldi H-MR, Brauer W: Synchronization without oscillatory neurons 209

Baxter RA → Wu X
Becker JD, Krüger J: Recognition of visual stimuli from multiple neuronal activity in monkey visual cortex 287
Benjamini Y → Kafkafi N
Blanzieri E, Grandi F, Maio D: High-order behaviour in learning gate networks with lateral inhibition 73
Bostock H → Stephanova DI
Brandt ME, Chen G: Controlling the dynamical behavior of a circle map model of the human heart 1
Brauer W → Arnoldi H-MR
Brocas J, Fromageot:Thermoregulation in homeotherms: central temperature results from optimization of energy transfers 225
Buchanan JJ, Kelso JAS, Fuchs A: Coordination dynamics of trajectory formation 41
Budelli R → Gómez L

Caelli T → Jüttner M
Cartling B: Dynamics control of semantic processes in a hierarchical associative memory 63
Cartling B: Dynamics control of semantic processes in a hierarchical associative memory (*Erratum*) 385
Celletti A, Villa AEP: Low-dimensional chaotic attractors in the rat brain 387
Cerf R, Sefrioui M, Toussaint M, Luthringer R, Macher JP: Low-dimensional dynamic self-organization in δ-sleep: effect of partial sleep deprivation 395
Chahl JS, Srinivasan MV: Visual computation of egomotion using an image interpolation technique 405
Chen G → Brandt ME
Combe P → Parodi O
Cooper LN → Shouval H

Davis KA, Voigt HF: Computer simulation of shared input among projection neurons in the dorsal cochlear nucleus 413
Dijkstra TMH → Giese MA
Dinse HR → Joublin F
Dror IE, Florer FL, Rios D, Zagaeski M: Using artificial bat sonar neural networks for complex pattern recognition: Recognizing faces and the speed of a moving target 331
Ducom J-C → Parodi O

Eckmiller R → Napp-Zinn H
Eddi F, Mariani J, Waysand G: Transient synaptic redundancy in the developing cerebellum and isostatic random stacking of hard spheres 139

Feldman AG → Laboissière R
Florer FL → Dror IE
Fromageot C → Brocas J
Fuchs A, Jirsa VK, Haken H, Scott Kelso JA: Extending the HKB model of coordinated movement to oscillators with different eigenfrequencies 21
Fuchs A → Buchanan JJ
Fukai T: Bulbocortical interplay in olfactory information processing via synchronous oscillations 309

Georgopoulos AP → Lukashin AV
Gielen CCAM → Giese MA
Gielen SCAM → Glasius R
Giese MA, Dijkstra TMH, Schöner G, Gielen CCAM: Identification of the nonlinear state-space dynamics of the action-perception cycle for visually induced postural sway 427
Gillner S → Mallot HA
Giuliani A, Lo Giudice P, Mancini AM, Quatrini G, Pacifici L, Webber CL Jr, Zak M, Zbilut JP: A Markovian formalization of heart rate dynamics evinces a quantum-like hypothesis 181
Glasius R, Komoda A, Gielen SCAM: A biologically inspired neural net for trajectory formation and obstacle avoidance 511
Golani I → Kafkafi N
Gómez L, Budelli R: Two neuron networks. II. Leaky integrator pacemaker models 131
Grandi F → Blanzieri E
Grind WA van de → Przybyszweski AW
Gurney K, Wright MJ: A biologically plausible model of early visual motion processing. I: Theory and implementation 339
Gurney K, Wrigth MJ: A biologically plausible model of early visual motion processing. II: Psychophysical application 349

Haken H → Fuchs A
Haken H → Tass P
Hofacker GL → Ritz BM
Holt KG → Turvey MT

Jansen M → Napp-Zinn H
Jirsa VK → Fuchs A
Joublin F, Spengler F, Wacquant S, Dinse HR: A columnar model of somatosensory reorganizational plasticity based on Hebbian and non-Hebbian learning rules 275
Jüttner M, Caelli T, Rentschler I: Recognition-by-parts: a computational approach to human learning and generalization of shapes 521

Kafkafi N, Levi-Havusha S, Golani I, Benjamini Y: Coordination of side-to-side head movements and walking in amphetamine-treated rats: a stereotyped motor pattern as a stable equilibrium in a dynamical system 487
Kelso JAS → Buchanan JJ
Kolev V → Slavcheva G
Komoda A → Glasius R
Korogod SM: Electro-geometrical coupling in non-uniform branching dendrites. Consequences for relative synaptic reflectiveness 85
Kral A, Majernik V: Neural networks simulating the frequency discrimination of hearing for non-stationary short tone stimuli 359
Kröller J: Third-order reverse correlation analysis of muscle spindle primary afferent fiber responses to random muscle stretch 9
Krüger J → Becker JD
Kugler PN → Turvey MT

Laboissière R, Ostry DJ, Feldman AG: The control of multi-muscle systems: human jaw and hyoid movements 373
Lankheet MJM → Przybyszewski AW
Lestienne R: Determination of the precision of spike timing in the visual cortex of anaesthetised cats 55
Levi-Havusha S → Kafkafi N
Levy WB → Wu X
Lo Giudice P → Giuliani A

Lukashin AV, Amirikian BR, Georgopoulos AP: Neural computations underlying the exertion of force: a model 469
Lukashin AV, Amirikian BR, Mozhaev VL, Wilcox GL, Georgopoulos AP: Modeling motor cortical operations by an attractor network of stochastic neurons 255
Luthringer R → Cerf R

Macher JP → Cerf R
Maio D → Blanzieri E
Majernik V → Kral A
Mallot HA, Gillner S, Arndt PA: Is correspondence search in human stereo vision a coarse-to-fine process? 95
Mancini AM → Giuliani A
Mariani J → Eddi F
McCollum G → Roberts PD
Meilijson I, Ruppin E: Optimal firing in sparsely-connected low-activity attractor networks 479
Miftakhov RN, Abdusheva GR, Wingate DL: Model predictions of myoelectrical activity of the small bowel 167
Miftakhov RN, Abdusheva GR: Numerical simulation of excitation-contraction coupling in a locus of the small bowel 455
Morán F → Andrade MA
Mozhaev VL → Lukashin AV

Napp-Zinn H, Jansen M, Eckmiller R: Recognition and tracking of impulse patterns with delay adaptation in biology-inspired pulse processing neural net (BPN) hardware 449

Obusek J → Turvey MT
Ostry DJ → Laboissière R

Pacifici L → Giuliani A
Parodi O, Combe P, Ducom J-C: Temporal coding in vision: coding by the spike arrival times leads to oscillations in the case of moving targets 497
Plamondon R, Privitera CM: A neural model for generating and learning a rapid movement sequence 117
Privitera CM → Plamondon R
Przybyszewski AW, Lankheet MJM, Grind WA van de: On the complex dynamics of intracellular ganglion cell light responses in the cat retina 299

Quatrini G → Giuliani A

Radicheva N → Slavcheva G
Rentschler I → Jüttner M
Rios D → Dror IE
Ritz BM, Hofacker GL: Informational properties of neural nets performing algorithmic and logical tasks 549
Roberts PD, McCollum G: Dynamics of the sit-to-stand movement 147
Ruppin E → Meilijson I

Sabatini SP: Recurrent inhibition and clustered connectivity as a basis for Gabor-like receptive fields in the visual cortex 189
Salo A → Turvey MT
Schneider G, Schuchhardt J, Wrede P: Evolutionary optimization in multimodal search space 203
Schöner G → Giese MA
Schuchhardt J → Schneider G
Scott Kelso JA → Fuchs A
Sefrioui M → Cerf R
Shouval H, Cooper LN: Organization of receptive fields in networks with Hebbian learning: the connection between synaptic and phenomenological models 439
Slavcheva G, Kolev V, Radicheva N: Extracellular action potentials of skeletal muscle fibre affected by 4-aminopyridine: a model study 235
Spengler F → Joublin F
Srinivasan MV → Chahl JS
Stephanova DI, Bostock H: A distributed-parameter model of the myelinated human motor nerve fibre: temporal and spatial distributions of electronic potentials and ionic currents 543
Sundareswaran V, Vaina LM: Adaptive computational models of fast learning of motion direction discrimination 319
Szeto HH → Akay M

Tass P, Haken H: Synchronized oscillations in the visual cortex – a synergetic model 31
Toussaint M → Cerf R
Turvey MT, Holt KG, Obusek J, Salo A, Kugler PN: Adiabatic transformability hypothesis of human locomotion 107

Vaina LM → Sundareswaran V
Vidybida AK: Neuron as time coherence discriminator 537
Villa AEP → Celletti A
Voigt HF → Davis KA

Wacquant S → Joublin F
Wagner A: Genetic redundancy caused by gene duplications and its evolution in networks of transcriptional regulators 557
Waysand G → Eddi F
Webber CL Jr → Giuliani A
Wilcox GL → Lukashin AV
Wingate DL → Miftakhov RN
Wrede P → Schneider G
Wright MJ → Gurney K
Wu X, Baxter RA, Levy WB: Context codes and the effect of noisy learning on a simplified hippocampal CA3 model 159

Zagaeski M → Dror IE
Zak M → Giuliani A
Zbilut JP → Giuliani A
Zielińska T: Coupled oscillators utilised as gait rhythm generators of a two-legged walking machine 263

Indexed in *Current Contents* and *Index Medicus*